

FOUR NEW GENERA AND TEN NEW SPECIES OF EELS FROM THE PACIFIC COAST OF TROPICAL AMERICA

(PLATES 7-16)

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After completing that portion of the manuscript on the marine fishes of the west coast of South America which deals with the Apodal fishes, it seems desirable at this time to describe the new forms. These were collected either by the senior author in tide pools or under an electric light swung at the ship's gangway at night while at anchor, or in dredge hauls from the ship or the small dredging launch, during the 1938 cruise of the *Velero III*, under the command of Captain Allan Hancock. The major part of the collecting was done at the Galapagos Islands and along the coasts of Colombia, Ecuador, and Peru; but a few species were obtained farther north along the Central American coast, especially at Cocos Island, Costa Rica. The authors are also including a new genus and two new species from the Hancock Pacific Expeditions' material in the United States National Museum, collected by Dr. Waldo L. Schmitt on the 1935 expedition.

In the list of specimens at the beginning of each description AHF refers to catalogue numbers in the ichthyological collections of the Allan Hancock Foundation. All holotypes save two are in the Allan Hancock Foundation. Where there is more than one paratype, one or more paratypes are to be deposited in the Natural History Museum of Stanford University, where the work upon these fishes was done.

Congridae

CHILOCONGER, new genus

Genotype.—*Chiloconger labiatus*, new species

Body elongate, head roughly cylindrical. Body and especially the tail compressed. Tail much longer than head and trunk. Dorsal fin inserted

behind gill openings, confluent with the anal around the tail. Pectoral fins well developed. Snout short and blunt, abruptly decurved, shorter than the eye. Flange of the upper lip developed into a short, broadly rounded flap, the highest part of which reaches the edge of the posterior nostril and covers a hollowed-out area. Another uncovered hollowed-out area below the eye. Posterior nostril with a well-developed rim, but no tube, directly in contact with the eye. A well-developed, tubed pore just above posterior nostril and in contact with both eye and nostril. Anterior nostrils tubular, on the upper lip and near tip of snout. Maxillary teeth triserial, not forming a cutting edge; vomerine teeth in a roughly oblong patch, narrower posteriorly; premaxillary teeth in a semicircular patch, separated from the vomerine teeth by a narrow groove. Tongue well developed, the edges free anteriorly and laterally. Gill openings far apart, vertical, and large. Eye large. Nine branchiostegal rays.

Close to *Ariosoma*, but differing in the extremely short, blunt head; the short snout, which is shorter than the eye; the excavated sides of the head below the eye and posterior nostril; and the wide flaplike flange of the upper lip.

***Chiloconger labiatus*, new species**

Plate 7

Holotype.—AHF no. 9.

Type locality.—Station 856-38, Port Utria, Colombia, dredged in 15-30 fms., mud and sand bottom, February 25, 1938.

Measurements of holotype in mm.—Length 83, depth 6, head and trunk 33, tail 50, head 14, snout 2.8, eye 3, gape of mouth 4, pectorals 5.

Description.—Head and trunk 1.5 in tail, 2.51 in total length. Tail 1.66 in total length. Head large, 2.36 in head and trunk, 5.93 in total length. Snout short, abruptly decurved and blunt, 5 in head, slightly shorter than the eye. Eye 4.66 in head. Gape of mouth 3.5 in head. Depth 13.8 in total length, 2.33 in head. Dorsal fin inserted behind gill openings, over tip of pectoral fins. Dorsal and anal fins continuous around tip of tail; anal not so high as dorsal. Pectoral fins well developed, 2.8 in head. Gill openings lateral, low on sides, the top of the opening at the upper end of the pectoral base. Isthmus equal to length of gill openings. Gular region ventrally with longitudinal folds.

Anterior nostrils tubular, inserted on the upper lip at the tip of the lower jaw. Posterior nostrils at level of lower edge of pupil, posterior

edge of nostril in contact with anterior border of eye, its edge slightly raised, but not tubular. Just above the nostril is a large, well-developed pore, with a diameter of slightly less than half that of the posterior nostril; the edge of the pore is in contact with the edge of the nostril. Upper jaw only slightly projecting beyond tip of lower jaw. Upper lip with a broad flange, developed into a high rounded flap, upturned against the side of the snout and in its highest part reaching the lower edge of the posterior nostril, and covering a hollowed-out area. The anterior end of the flange is joined to the snout well above the mouth, on the same plane as the upper edge of the anterior nostril. From this point the dorsal edge of the flange curves upward until it reaches the lower edge of the posterior nostril, then downward to the point at which the posterior end joins the upper lip at a vertical through the pupil of the eye. The hollowed-out area hidden by the flange flap is followed by a smaller, fully visible hollow directly below the eye; this second hollow is separated from the first by a slightly inclined, vertical partition. Lower lip with a broad flange, longer than the upper but not developed into an extensive flap.

Maxillary teeth in three irregular rows, closely united to the head of the shaft of the vomer. Vomerine teeth in a roughly oblong patch, narrower posteriorly. Premaxillary teeth in a semicircular patch anterior to the symphysis of the lower jaw, and separated from the vomerine teeth by a slight groove. Mandibular teeth in a narrow band. All teeth small, pointed, fairly close set and subequal; in appearance they are villiform. Tongue well developed, edges free anteriorly and laterally.

Color light yellowish brown; back and sides peppered with minute dark specks. Under sides of the head, except for tip of lower jaw, edge of the upper lip, and an area between the jaws under the center of the eye, without the dark specks. Distal half of lip flanges colorless. Dorsal fin with a dark distal border anteriorly, becoming only a faint dark line on the remainder of the fin. Anal and pectoral fins colorless.

Genus **ARIOSOMA** Swainson

Ariosoma Swainson, 1838, Nat. Hist. Fishes, Amphibians and Reptiles, vol. 1, p. 220;—1839, *op. cit.*, vol. 2, p. 196 (no species mentioned; this genus is evidently the same one which Swainson calls *Ophisoma* in his second volume, and we therefore hold that its type was designated by Bleeker, 1864, Atlas Ichthyologique, vol. 4, p. 20, when he indicated that *Ariosoma*=*Ophisoma*=*Conger*-

muraena; and the type by subsequent designation of Bleeker is therefore *Ophisoma acuta* Swainson, 1839, vol. 2, p. 396, which equals *Muraena balearica* De la Roche).

Ophisoma Swainson, 1839, *op. cit.*, vol. 2, p. 334 (type *O. acuta* Swainson = *Muraena balearica* De la Roche, by subsequent designation of Bleeker, 1864; see explanation under *Ariosoma* above).

Congermuraena Kaup, 1856, Cat. Apodal Fishes, p. 71 (type *Muraena balearica* De la Roche, by subsequent designation of Bleeker, 1864).

Congrellus Ogilby, 1898, Proc. Linn. Soc. New South Wales, vol. 23, p. 288 (type by original designation *Muraena balearica* De la Roche).

Upper lip with a flange, which is rather narrow and not developed into a wide flap. No facial excavations above the upper lip. Bony facial canals not sending processes into the flange of the upper lip. Teeth pointed, not forming a cutting edge. Dorsal inserted over gill openings. Snout pointed, somewhat longer than eye. Posterior nostril in advance of eye, with which it is not in contact; a tubed pore above the posterior nostril but not in contact with it.

KEY TO EASTERN TROPICAL PACIFIC SPECIES

- 1a. Head and trunk 1.42 in tail; cleft of mouth 4 in head; maxillary teeth in a single irregular row; mandibular teeth in a single row posteriorly, medially in two rows and anteriorly in three rows; 6 to 8 teeth grouped at head of vomer and 2 or 3 small teeth on the shaft (Coast of Colombia). *A. vomerina*, new species.
- 1b. Head and trunk 1.85 in tail; cleft of mouth 3.4 to 3.8 in head; teeth in jaws in villiform bands; vomerine teeth in an elongate triangular patch on head and shaft of the vomer (Cape San Lucas to northern Colombia). *A. gilberti* (Ogilby).

Ariosoma vomerina, new species

Plate 8

Holotype.—AHF no. 10.

Type locality.—Station 856-38, Port Utria, Colombia, dredged in 15-30 fms., mud and sand bottom, February 25, 1938.

Measurements of holotype in mm.—Length 99, head and trunk 41, tail 58, head 14, snout 3, eye 2.5, cleft of mouth 3.5, depth 6, pectorals 5, gill openings 2.5, isthmus 2.

Description.—Body elongate, cylindrical except the last fourth of tail, which becomes somewhat compressed. Body heavier at middle than anteriorly. Head and trunk 1.42 in tail. Head 2.92 in head and trunk, 7.07 in total length; its greatest depth slightly less than greatest depth of body. Eye 1.2 in snout and 5.6 in head. Snout 4.66 in head. Cleft of mouth 4 in head, not quite reaching below center of eye. Body depth greatest at midpoint of total length, into which the depth goes 16.5 times. Isthmus slightly narrower than height of gill openings, which are equal to eye. Pectorals long and narrow, well developed, 2.8 in head. Dorsal fin inserted over gill openings, low anteriorly, becoming higher on tail. Anal fin about equal in height to dorsal. Both fins confluent around tip of tail. Gill openings low on sides, vertical, top of slit not reaching the upper edge of the narrow pectoral base.

Anterior nostrils tubular, just above edge of upper lip, near tip of snout. Posterior nostril just in front of eye, but not in contact with it, and at the level of the lower edge of the pupil; it is elongated and has a very slightly raised rim. Maxillary teeth in one irregular series, the teeth small, pointed, slender, depressible, and irregularly placed, slightly larger and more recurved anteriorly. Maxillary teeth continued around tip of jaw, and somewhat enlarged. Vomerine teeth in a small patch of 6 to 8 teeth at the head of the shaft; behind this there is a short irregular row of small teeth on the shaft. Mandibular teeth similar to maxillary teeth in size and shape, disposed in a narrow band, narrowing posteriorly to a single row, and widening anteriorly into three irregular rows.

Color very light cream, with no dark markings on the body, except minute black specks dorsally, which are visible only under the microscope.

From *Ariosoma gilberti*, the only other known species from eastern tropical Pacific, *vomerina* differs in having the maxillary teeth uniserial and not in a villiform band. In *vomerina* there are 6 to 8 teeth at the head of the shaft of the vomer, followed by 3 to 4 small teeth on the shaft, while in *gilberti* the vomerine teeth are arranged in an elongate triangular patch with a long posterior projection. In *vomerina* the tail is longer than the rest of the body by a length greater than the head, while in *gilberti* the tail is only the length of the snout longer than the rest of the body. *Vomerina* also differs from *gilberti* in having the isthmus narrower than the gill openings, instead of much wider.

Echelidae

See Myers and Storey 1939, Stanford Ichth. Bull., vol. 1, no. 4, p. 156, for remarks on the classification of this family.

Genus **GARMANICHTHYS** Seale

Garmanichthys Seale, 1917, Bull. Mus. Comp. Zool. Harvard, vol. 61, p. 80 (type by monotypy *G. dentatus* Seale).

Arenichthys Beebe and Tee-Van, 1938, Zoologica, Sci. Contrib. New York Zool. Soc., vol. 23, p. 301 (type by original designation *A. apterus* Beebe and Tee-Van).

This genus is composed of small eels differing from the Indo-Pacific *Muraenichthys* chiefly in the more anterior insertion of the dorsal fin, which begins above or slightly behind the gill openings instead of far behind. Pectoral fins absent. Vomerine teeth in two more or less parallel series, the series separated by an interspace anteriorly, running close together posteriorly, with one median, enlarged tooth at the beginning of the vomerine series. Snout pointed. Lower jaw shorter than the upper. Two of the three known species show one or two collarlike color bands at the nape. Seale's description of *G. dentatus* mentions "ten" vomerine series, which is evidently a misprint for "two."

This genus is entirely American in its known distribution. *G. dentatus* is described from Barbados in the Atlantic. The other two species are from the eastern Pacific.

KEY TO THE KNOWN SPECIES

- 1a. Body yellowish, thickly banded with brown across the body and fins; a white band across the nape (Barbados). . . *G. dentatus* Seale.
- 1b. Body plain brown or longitudinally bicolor; no bands or only one or two on head.
 - 2a. Dorsal beginning a snout length behind the gill opening; body bicolor, brown above and whitish beneath, the line of demarcation sharply marked from eye to near end of tail; no band across nape; canthal line and upper lip white; lower jaw with a longitudinal brown line (Cape San Lucas and Gorgona Island).
 - *G. apterus* (Beebe and Tee-Van).

- 2b. Dorsal beginning above the gill opening; body bicolor only to a point slightly behind the anal origin; no white canthal line; a white band across nuchal region and another band across the back at the origin of the dorsal fin; lower jaw unmarked (Galapagos).
 *G. bicollaris*, new species.

***Garmanichthys bicollaris*, new species**

Plate 9

Holotype.—AHF no. 11.

Type locality.—Station 798-38, Cartago Bay, Albemarle Island, Galapagos, at surface under electric light, January 21, 1938.

Paratypes.—Three specimens, 170-195 mm., Station 73-33, North Beach, Albemarle Island, Galapagos, February 13, 1933.

Measurements of holotype in mm.—Total length 160, head and trunk 54, tail 106, depth of body 7, head 19, eye 2.8, snout 4.5, interorbital (not bony) 3, gape 6, length of gill opening 1.5, height of dorsal at a point 63 mm. from tip of tail 2.5, height of anal at same point 2.

Description.—Body rounded in cross section anteriorly, growing somewhat more compressed posteriorly. Depth 22.85 in total length, head 8.94, head and trunk 2.96. Tail 1.96 in head and trunk. Snout 4.22 in head, interorbital 6.33. Skin naked and smooth. Snout covered with fine, short, hairlike papillae, which are more scattered on lower jaw and other parts of head and gular region. Snout flattened dorsally and broadly rounded in dorsal aspect. Head only very faintly swollen in occipital region. Interorbital broad, two thirds the length of the snout. Gape barely reaching vertical from posterior margin of eye. Anterior nostrils tubular and directed downward, placed almost at tip of snout, the length of the tubes less than one-third diameter of eye. Posterior nostrils opening downward in the upper lip directly below anterior margin of eye; they have slightly raised edge, which is developed into a distinct flap on the outer side, this flap folding down and concealing the opening. A groove immediately follows the nostril and runs forward and toward the inside of the mouth between the nostril and a conspicuous pore just behind it. Gill openings small, oblique (at an angle of 40° from horizontal), placed laterally at the center of the body depth, more than half the diameter of the eye in length. Surface of gular-branchial region with a few longitudinal folds. Jugostegalia not evident but possibly present. Four pores anteriorly on top of the snout, two on each side just above and

behind the anterior nostrils, forming a quadrangle. Upper lip with five pores on each side under its edge, about equally spaced, one before anterior nostril, two between anterior and posterior nostrils, one just behind the posterior nostril and one at the angle of the jaws. Lower jaw with a series of four pores on each side, the last about below the end of the gape.

Maxillary teeth laterally in two rows (at one point two thirds of the way back on jaw, in three irregular rows), the outer row of very small teeth, the inner row of somewhat larger ones. Maxillary teeth separated anteriorly from the large, circular patch of premaxillary teeth, which are scarcely separated from those on the shaft of the vomer. The vomerine teeth begin with one median tooth and extend backward as two regular, rather widely separated series, which gradually run close together and finally coalesce into a single series posterior to a vertical from the end of the orbit. Mandibular teeth on each side anteriorly in a wide band of three or four rows, the bands of the two sides appressed anteriorly; posteriorly the band narrows to a single irregular series; anteriorly the inner teeth are largest. All teeth in mouth pointed, those of the premaxillary and vomer stouter and larger than the others.

Dorsal and anal fins high, confluent around end of tail. Origin of dorsal over gill openings. No pectoral fins.

Body longitudinally bicolor to a point about a head-length behind anus, the brownish dorsum sharply differentiated from the whitish underside. Posteriorly, on the tail, the light venter disappears and the color is a uniform brown, slightly lighter below. At the origin of the dorsal fin the light ventral color crosses the dorsum to form a collarlike band, and another such band crosses the head in the occipital region. On the sides of the snout, just behind the anterior nostril, a small patch of the brown color descends to the lower part of the snout. Tip of lower jaw with a dark patch at each side. Dorsal and anal fins light.

This species is allied to Beebe and Tee-Van's *apterus*, which was described from near Cape San Lucas, and of which we have an example from Gorgona Island, Colombia. In *bicollaris* the dorsal fin is inserted over gill openings instead of almost a snout length posteriorly to them as in *apterus*. The larger eye and the distinctively different color pattern also serve to distinguish this new form.

LEPTENCHELYS, new genus

Genotype.— *Leptenchelys vermiformis*, new species

Body elongate, cylindrical, vermiform, becoming slightly compressed

toward tip of tail. Tail shorter than head and trunk. Branchial region greatly swollen, with jugostegalia very evident and reaching far up on the dorsum. Dorsal fin inserted anterior to gill openings, slightly closer to them than to eye, the fin very low and poorly developed anteriorly, becoming higher toward the end of the tail. Dorsal confluent with anal around tip of tail. Anal fin inserted just posterior to anal opening. No pectoral fins present.

Head pointed, snout projecting beyond mouth. Anterior nostrils tubular, directed downward, near tip of snout. Posterior nostrils under edge of upper lip below eye. All teeth uniserial; premaxillary teeth present, visible when the mouth is closed. Lateral line prominent, continued forward over the head to the tip of the snout, and sending off accessory branches dorsally and ventrally on the head. Pores around edges of upper and lower jaws large, with raised rims. Pores of lateral line extending to the surface through tubules, the outer end of these tubules slightly elevated above the surface of the body.

This genus is similar to *Muraenichthys* and *Garmanichthys* in the absence of pectoral fins. It differs from them in the following: (1) the very pointed head, (2) the insertion of the low anterior part of the dorsal fin on the head anterior to the gill openings (instead of near vent as in *Muraenichthys* and near the gill opening as in *Garmanichthys*), (3) the uniserial vomerine teeth, and (4) the short tail.

Leptenchelys vermiformis, new species

Plate 10

Holotype.—U.S. National Museum, no. 101785.

Type locality.—Station 462-35, Playa Blanca, Costa Rica, dredged in 40 fms., mud and sand bottom, February 8, 1935.

Measurements of holotype in mm.—Total length 115, depth of body posterior to branchial region 2.6, head and trunk 67, tail 48, head 11, eye .5, snout 1.8, cleft of mouth 2.5.

Description.—Body elongate, cylindrical, wormlike; somewhat compressed toward end of tail. Tail contained 1.39 in head and trunk, 2.39 in total length. Head 10.45 in total length, 6.09 in head and trunk. Snout short, 6.1 in head. Eye very small, 22 in head, 5 in snout. Cleft of mouth 4.4 in head. Depth 44.23 in total length. Dorsal fin inserted on head before gill openings, slightly nearer to them than to eye. Dorsal fin low and poorly developed, except posteriorly on tail, where it becomes

higher and lies in a groove. It is confluent with anal fin around tip of tail. Anal fin inserted immediately behind anal opening; low and poorly developed its entire length. No pectoral fins.

Head pointed, the snout projecting well beyond mouth. Mouth inferior and upper jaw longer than lower. Anterior nostrils tubular, directed downward, and located on the snout just anterior to the symphysis of the lower jaw; tubes almost equal in length to eye. Posterior nostrils an elongate slit on the under side of upper lip just below anterior edge of eye, the slit covered by a pendulous flap of skin. Eye small, located slightly nearer to angle of jaws than to tip of snout. Top of head and snout covered with many bluntly tipped, small, villiform papillae, especially abundant on snout and interorbital space. Gill openings low on sides, almost vertical, and deeply curved. The membranes covering the gill chambers expanded, giving a pouchlike effect to this area of the head. Jugostegalia evident as numerous, fine, slightly curved lines running obliquely, crossed by other lines to form a typical crosshatched pattern.

Maxillary, mandibular, and vomerine teeth uniserial. The teeth small, conical, sharp, and slightly recurved. Anteriorly in the jaws they become slightly larger and more widely spaced. Three or four teeth on shaft of vomer. Premaxillary teeth only two in number, visible when the mouth is closed. They lie between the anterior nostrils and are caninelike, curved, depressible, and larger than the rest of the teeth. The lateral line is prominent. Each pore opens on the surface through a short tubule directed downward from the main lateral tube. The outer end of each tubule has its edge slightly raised above the surface of the body. The lateral line continues forward past the gill opening, abruptly arching above the gill chambers and continuing forward over the eye to the tip of the snout. Just anterior to the gill chambers, two branches are given off, one extending dorsally and meeting a like branch from the other side, the other extending ventrally and forward along the side of the lower jaw. Immediately behind the eye two more branches are given off, the dorsal joining a corresponding branch from the other side, on the midline of the back and the ventral branch passing under the eye and extending anteriorly along the edge of the upper jaw. Along the sides of the upper and lower jaws and anteriorly on the head are large, prominent pores lying over the various branches of the lateral line, and with well-developed rims which extend above the surface.

The color of the body is light yellowish, and there are no color markings.

Ophichthyidae

Genus CAECULA Vahl

Caecula Vahl, 1794, *Skriv. Naturh. Selsk.*, Kjöbenhavn, vol. 3, p. 149 (type by monotypy *C. apterygia* Vahl).

Sphagebranchus Bloch, 1795, *Naturgeschichte ausland. Fische*, vol. 9, p. 88 (type by monotypy *S. rostratus* Bloch).

Verma Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.*, no. 47, pt. 1, p. 374 (type by original designation *Sphagebranchus kendalli* Gilbert).

Vertical fins absent or feebly developed. No pectoral fins. Posterior nostrils in the upper lip and directed downward. Gill openings small, close together, longitudinal, oblique, or vertical. Gill membrane not apparently duplicating the gill opening anteriorly by a false fold. Snout projecting far beyond the lower jaw. Teeth small and mostly uniserial.

KEY TO EASTERN TROPICAL PACIFIC SPECIES

- 1a. Eye 5 in snout; snout 6.6 in head; cleft of mouth 3.8 in head; width of isthmus equal to eye; posterior nostrils under edge of upper lip, elongate and with a raised rim; dorsally and laterally snout is sharply pointed (Colombia, off Cocos Island, Costa Rica, and north to Cape San Lucas). . . . *C. selachops* (Jordan and Gilbert).
- 1b. Eye 3.4 in snout; snout 4.76 in head; cleft of mouth 4.26 in head; width of isthmus equals one half of eye; posterior nostrils a slightly rounded pore above edge of upper lip with no raised rim present; dorsally the snout is very blunt and rounded, not at all sharp (Galapagos Islands). *C. equatorialis*, new species.

Caecula equatorialis, new species

Plate 11

Holotype.—AHF no. 12.

Type locality.—Station 810-38, north of Barrington Island, Galapagos, 0° 43' S., 90° 01' W., dredged in 73 fms., on a sand bottom, January 26, 1938.

The type was cut in two by the dredge, and only the anterior part of the specimen is present, but this is in good condition and seems to represent a new form.

Measurements of the holotype in mm..—Head 16, head and trunk 93, eye 1, snout 3.4, cleft of mouth 3.75, interorbital 1.2.

Description.—Cleft of mouth 4.26 in head, snout 4.76. Eye 3.4 in snout, 16 in head. Body elongate and cylindrical, no evidence of any fins present. Gill openings inferior; they are curved (convex side anteriorly) in the form of a quarter-segment of a circle; the medial end of each slit is transverse, the posterior end horizontal. Isthmus very narrow, one-half diameter of eye. Dorsal outline of snout curved downward, ventral border of snout straight. Dorsally tip of snout broadly rounded. Eye nearer the angle of the jaws than tip of snout, just posterior to the symphysis of the lower jaw. A shallow groove above and paralleling the upper lip, from the posterior nostril backward, fading out before the end of the gape.

Anterior nostrils tubular, set in a pit; opening of the tube hourglass shaped, formed by two opposed papillae projecting into the opening. Posterior nostril a rounded pore without a raised rim, set above the edge of the lip on the outside of the mouth, at the anterior end of the groove which parallels the edge of the upper lip. Maxillary teeth uniserial, small, slender, close set, and recurved. Vomerine teeth uniserial, somewhat larger at the head of the shaft. Premaxillary teeth four, two on a side at the symphysis of the upper jaw. Mandibular teeth uniserial, similar to the maxillary teeth, except that anteriorly a few of the teeth are slightly enlarged. Gular region with faint longitudinal folds; jugostegalia evident. Lateral line curved upward anteriorly over the opercular apparatus.

Body color light cream with no dark markings of any kind. The snout and the anterior part of the head are somewhat lighter in color.

In comparison with a specimen of *C. selachops* of almost the same diameter and of what we judge to be almost the same size, we find that the snout of *equatorialis* is a great deal heavier, blunter, and more broadly rounded from the dorsal aspect. The eye is farther forward on the head, the head much shorter, and the lower jaw is broader and not so long and pointed. In *equatorialis* the mouth is smaller, and the position of the posterior nostrils is above the outside edge of the upper lip and not under it as in *selachops*. The anterior nostrils are set in a pit and not on the surface, and the tip of the snout is not black.

PHAENOMONAS, new genus

Genotype.—*Phaenomonas pinnata*, new species

Body elongate, cylindrical, very wormlike. Head and trunk very much longer than tail. A short, well-developed dorsal fin present, beginning on the head in advance of the gill openings, *its entire length shorter than the head*. No pectoral or anal fins present. Snout blunt, lower jaw included, eye small, closer to angle of jaws than to tip of snout. Anterior nostrils tubular, on underside of snout. Posterior nostrils on underside of upper lip, inside the mouth, the pore covered by a flap of membrane. Gill openings wide apart, vertical, and low on sides. All teeth uniserial, pointed and close set.

This remarkable little eel differs from all known Ophichthyid genera in the brief, anteriorly placed, well-defined dorsal fin and in the absence of all other fins.

Phaenomonas pinnata, new species

Plate 12

Holotype.—AHF no. 13.

Type locality.—Station 856-38, Port Utria, Colombia, dredged in 15-30 fms., mud and sand bottom, February 25, 1938.

Paratype.—One specimen, 233 mm., Station 870-38, Isabel Island, Nayarit, Mexico, dredged on coralline bottom, March 8, 1938.

Measurements of the holotype in mm.—Length 221, head and trunk 153, tail 68, snout 2.5, eye .5, cleft of mouth 2.5, depth 3.

Description.—Body very elongate, cylindrical, not compressed; tail ending in a blunt, conical point. Depth of body in total length 73.66. Head and trunk 1.44 to 1.47 in total length. Tail very short, 2.1 to 2.25 in head and trunk. Dorsal fin present, beginning half way between the gill openings and the angle of the jaws, ending slightly less than this distance behind the gill opening, its height about twice eye diameter. No anal or pectoral fins. Lateral line lying in a slight groove anteriorly and on a slightly raised ridge posteriorly, but this may be due to the preservation of the specimens.

Anterior nostrils tubular, on the under side of the snout, anterior and lateral to the tip of the lower jaw. Anteriorly each nostril is recessed into a pit; posteriorly the tube is on the edge of the upper lip. Lying between the anterior nostrils are two papillalike folds of skin, pointing backward

and attached by their inner surfaces to the underside of the snout. Posterior nostrils under the edge of the upper lip, lying entirely within the mouth and covered by a flap of skin, which must be lifted before the rounded pore is visible. Gill openings wide apart, vertical, and low on the side. Isthmus equal in width to the height of the gill opening. Just inside the edge of the gill opening there is a dermal fold of skin, forming what first appears to be another opening. Gular region not particularly swollen, ventrally with many longitudinal folds. Jugostegalia not evident externally.

Eye small, 5 to 6 in snout, 25 to 27 in head; much closer to angle of jaws than to tip of snout and only faintly visible under the skin. Snout projecting beyond end of lower jaw for a distance equal to width of the isthmus, its ventral surface swollen so that the mouth is included behind it. Snout 4.5 to 5 in head, cleft of mouth equal to snout. Head small, 17.26 to 17.68 in total length and 11.7 to 12.4 in head and trunk; its point blunt and rounded. All teeth uniserial. Maxillary teeth not following the curve of the jaws, but running in a straight line from their posterior insertion to where the anterior teeth meet at the head of the vomerine shaft. One slightly enlarged tooth at the symphysis of the two rows, all teeth pointed, small and close set. Vomerine teeth in a single row of about five teeth, the first largest, becoming smaller posteriorly. Posterior nostrils entirely outside the row of teeth. Premaxillary teeth not in a row around the tip of the snout; one large tooth lying under the median edge of each of the papillalike folds of skin between the anterior nostrils, a smaller tooth lying just posterior to each of the anterior teeth. Mandibular teeth in a single series, small and close set posteriorly, becoming larger, caninelike, and more widely spaced anteriorly. The tips of the anterior two mandibular teeth of each side fit into small pores in the roof of the mouth.

Color whitish, no markings or pattern of any kind. Under the microscope, small pin points of dark dots are visible, most abundantly placed along the mid-line of the side.

POGONOPHIS, new genus

Genotype.—*Pogonophis fossatus*, new species

Dorsal and anal fins rather well developed, the former inserted a short distance behind the gill openings, becoming more elevated posteriorly, both the dorsal and anal in a groove near the tip of tail, as is com-

monly the case in Ophichthyids. Gill openings rather wide, lateral, oblique, and curved; the isthmus wide with no grooves across it, a slight dermal fold behind the gill opening and another in front. Jugostegalia faintly evident externally. Vomer with a single series of depressible teeth, the anterior tooth longest. Pectoral fins reduced, small, less than the diameter of the eye in length. Teeth all pointed, none molariform. Maxillary teeth biserial, the rows separated by a narrow trough; outer row of smaller teeth, inner row larger. Mandibular teeth uniserial, a few anterior ones larger. Two enlarged canines at the front of the upper jaw immediately behind the anterior premaxillary teeth. Anterior nostrils tubular, the lower part of the margin of each elongated into a pendant, barbel-like flap. Posterior nostrils beneath the eye, slitlike, opening downward, their position marked externally by rather conspicuous narial barbels nearly half the eye diameter in length. Sides of snout constricted by a groove just behind the anterior nostrils and by another just behind the posterior nostrils. Snout from above not particularly pointed and more rounded than in typical Ophichthyids.

Distinguished from other genera of Ophichthyids by the narial barbels, the rounded snout, equal jaws, the grooves behind the anterior and posterior nostrils, and many other characters.

***Pogonophis fossatus*, new species**

Plate 13

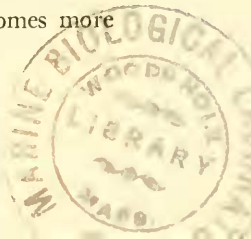
Holotype.—AHF no. 14.

Type locality.—Station 780-38, 5° 33' 50" N., 86° 58' 46" W., dredged in 40-47 fms., January 14, 1938.

Paratypes.—2 anterior portions of much larger specimens, Station 780-38, 5° 33' 50" N., 86° 58' 46" W., dredged in 40-47 fms., January 14, 1938.

Measurements of the holotype in mm.—Length 108, head and trunk 52, tail 56, head 15, depth 6, cleft of mouth 6, snout 3, eye 1.8.

Description.—Body elongate, cylindrical, slightly compressed toward the tip of tail. The tail slightly longer than head and trunk. Depth 18 in total length; head 7.2 in total length, 3.46 in head and trunk. Cleft of mouth 2.5 in head, snout 5 in head, eye 1.66 in snout. Skin smooth and naked. Jaws equal in length, snout not projecting. Dorsal fin low, inserted 1.5 times length of snout behind gill opening; it becomes more



elevated posteriorly near the tip of tail and lies in a definite groove. Anal fin beginning immediately behind the anal opening and lower than dorsal; it also lies in a groove. Tip of tail projecting beyond ends of fins. Pectoral fins rudimentary, one-half to four-fifths diameter of eye, inserted at the upper edge of gill openings. Eye slightly nearer to angle of jaws than to tip of snout. Pupil elliptical. Gill openings vertical, deeply curved, low on sides, slightly greater in length than orbit. Isthmus broad, slightly wider than length of snout.

Anterior nostrils just above edge of upper lip, tubular, the tube as long as eye and closer to tip of snout than to eye. Lower side of tube with an elongate, triangular flap of membrane almost equal in height to the tube. Posterior nostrils under edge of upper lip, on a vertical from the anterior edge of the eye; their position marked externally by rather conspicuous labial barbels, which are almost one half the diameter of the eye in length. Maxillary teeth in two series laterally. The outer series extends as far forward as the posterior nostril with about eight to ten close-set, pointed, sharp, slightly recurved teeth, smaller than those of the inner series. Inner series with about ten more widely spaced and larger teeth. The inner series is continued forward to the midpoint between anterior and posterior nostrils, with a space before the premaxillary teeth begin. Premaxillary teeth in a single series, about five in number around the tip of the upper jaw. Two large canine teeth, close set, side by side, lie just behind the premaxillary row. Vomerine teeth in a single series, anterior tooth largest, becoming progressively smaller posteriorly; about ten teeth on shaft of vomer. Mandibular teeth in a single series, slender, pointed, and equal in size to the outer series of the maxillary but more closely set, about fifteen teeth on a side. The three anterior teeth of each side are somewhat larger and heavier than the more posterior, lateral ones. No teeth lying inside the tip of the lower jaw.

Body color a light yellowish tan. Dorsally along each side of the fin are large, paired, dark-brown spots, lying close to the fin but not crossing it. From the insertion of the dorsal anteriorly the spots are smaller and not paired. The dark spots on the dorsal side of the head are abruptly smaller than those of the body. Mid-line of the side reddish brown for the entire length of body, with darker spots included at intervals. From these dark spots, dark-brown bars extend down upon the light yellowish ventral surface; anteriorly these bars either meet faintly or are close together, becoming weaker and farther apart posteriorly. Lower jaw and sides of head with small, dark spots.

Genus **LETHARCHUS** Goode and Bean

Letharchus Goode and Bean, 1882, Proc. U.S. Nat. Mus., vol. 5, p. 436
(type by monotypy *L. velifer* Goode and Bean).

Dorsal fin inserted slightly behind eye; the fin high until above the middle of tail, becoming obsolete toward end. Anal and pectoral fins entirely absent. Mouth and cranial parts of the head very small for an Ophichthyid, the mouth inferior. Gill openings curved, the posterior part of each nearly horizontal. A deep pocket, like a second (anterior) opening, in front of each gill opening. Directly below the gill openings a deep, transverse groove (indistinct in poorly preserved specimens) crosses the isthmus. From this groove, two folds of skin extend backward on each side of the under part of the body, fading out somewhere between the middle of the trunk and the anal opening; between the folds the belly is flat.

Gular region swollen, the exterior of the lower part thrown into several longitudinal folds in well-preserved specimens, these folds ending abruptly at the transverse groove across the isthmus. Jugostegalia well developed. Anterior nostrils with an incipient or well-developed tube; the end of tube with three papillae, one anterior and two lateral (the lateral larger), which project into the opening and tend to close the nostril. Posterior nostrils under lip and beneath eye, more or less slitlike and marked externally by a dermal flap beneath the eye. Lateral line conspicuous.

Three species known, one from the coast of the South Atlantic States and the Caribbean, another from Lower California, and the third, the new species described below. The above description was made from an examination of a specimen of *L. velifer* (Stanford 3932), from Charleston, South Carolina, and the types of *L. opercularis*.

KEY TO THE KNOWN SPECIES

- 1a. Anterior nostrils scarcely tubular; lower jaw much longer than its width from rictus to rictus; pupil ovate, the iris dark except for a light inferior elliptical or top-shaped area (which includes the pupil); middle of pupil far anterior to the middle of the length of the lower jaw; body deep uniform brown; the dorsal fin white with a dark margin (Atlantic). *L. velifer* Goode and Bean.

- 1b. Anterior nostrils in a well-developed tube; lower jaw only slightly longer than its width from rictus to rictus; pupil round, the iris light except for its outer rim; middle of the pupil directly above or very slightly anterior to the middle of the lower jaw; head and dorsal fin spotted or mottled (Eastern Pacific).
- 2a. Eye 14 to 16.8 in head; head in trunk 7 to 8.3; tail 1.41 to 1.5 in trunk; snout 7.4 to 8.6 in head; isthmus half again as wide as diameter of eye; a pendulous, operculumlike fold of skin hanging down over and screening gill openings (Galapagos).
 *L. opercularis*, new species
- 2b. Eye 12 in head; head 6.5 in trunk; tail 1.66 in trunk; snout 6 in head; isthmus equal to eye; no pendulous fold of skin hanging down over and covering the gill openings (Gulf of California).
 *L. pacificus* Osburn and Nichols.

***Letharchus opercularis*, new species**

Plate 14

Letharchus pacificus (nec Osburn and Nichols) Fowler, 1932, Proc. U.S. Nat. Mus., vol. 80, art. 6, p. 3 (Gardner Bay, Hood Island, Galapagos).—Fowler, 1938, Mon. Acad. Nat. Sci. Philadelphia, no. 2, p. 251 (name only).

Holotype.—AHF no. 15.

Type locality.—Station 813-38, Gardner Bay, Hood Island, Galapagos, collected at surface with electric light, January 27, 1938.

Paratypes.—Five specimens, 190-295 mm., Station 813-38, Gardner Bay, Hood Island, Galapagos, collected at surface with electric light, January 27, 1938.

Measurements of holotype in mm.—Length 381, head and trunk 232, tail 149, head 29, depth 9.6, snout 3.5, eye 1.5, cleft of mouth 4, isthmus 2.5.

Description.—Body elongate, somewhat compressed, dorsally rounded, ventrally somewhat flattened. Tail much shorter than head and trunk, 1.57 to 1.70 in them, ending in a sharp point. Head 12.9 to 14.1 in total length, 7 to 8.3 in trunk, 8 to 9.3 in head and trunk. Depth 29.1 to 39.6 in total length, 2.3 to 3.02 in head. Snout 7.4 to 8.6 in head; eye 14 to 16.8 in head, 2 to 2.3 in snout. Isthmus much wider than diameter of eye. Skin smooth and naked. Mouth inferior; lower jaw much shorter than

upper; snout sharply pointed, projecting beyond the mouth a distance equal to that from symphysis of upper jaw to center of eye. Lateral line distinct, lying in an uncolored space along the sides.

Dorsal fin beginning the length of the gape behind the posterior edge of the eye, high anteriorly, becoming lower on the anterior portion of tail, and finally becoming almost nonexistent on the posterior third of the tail. Dorsal fin not covered with heavy membrane, the rays visible. Pectoral and anal fins absent. Eye small, situated much nearer to angle of jaws than to tip of snout.

Anterior nostrils on underside of snout, tubular, the tube extremely thick and heavy, a little more than half the diameter of the eye in outside diameter and length. Each tube with 3 papillae on the rim of the orifice, one anterior and two lateral, the posterior part of the rim lacking one; these papillae project into the opening and tend to close the nostril. Between the nostrils a heavy rounded fold of skin runs posteriorly and bifurcates, forming two papillae just anterior to the tip of the closed lower jaw. Posterior nostrils within the mouth just under the eye. Without manipulation they appear to be wide, almost *transverse* slits protected by a delicate membrane on the anterior side. Upon manipulation, it becomes evident that the apparent flaps are only the higher anterior part of a circular, more or less tubular membrane surrounding the round nostril openings in the roof of the mouth, this membrane normally folding so as to almost completely hide the nostril. On the outside of the mouth the lip is interrupted immediately posterior to the lateral end of the folded membrane flap of the nostril by a transverse break. Posterior to this break the lip is again evident, but bordered above by a lateral groove extending deep into the face below the eye and fading out posteriorly before the end of the gape is reached. There is a similar deep groove below the posterior part of the lower lip.

Gill openings inferior and curved, posteriorly almost horizontal, anteriorly curving transversely to the median line. A deep pocket, like a second anterior opening, in front of each gill opening. The distal membrane of this pocket is developed into an operculumlike covering, somewhat pendulous, extending downward and covering the openings to the pocket and gills. Jugostegalia well developed. Isthmus crossed by a transverse groove. From the isthmus two folds of skin, one on each side, run backward delimiting the flattened area of the venter; these folds fade posteriorly on the body. Anteriorly several faintly marked, parallel folds lie medially to each main lateral fold. Maxillary teeth uniserial, well

inside the edge of the jaw; they are very small, sharp, pointed, and close set, extending anteriorly to the inside edge of the posterior nostril. Vomerine teeth somewhat larger, depressible, in a diamond-shaped patch; no teeth on shaft of vomer. No premaxillary teeth. Mandibular teeth uniserial and similar to the maxillary teeth.

Body color light yellowish, overlaid with dark brown. This dark-brown pattern varies from longitudinal rows of dark spots with the lighter body color prominent, to individuals with this body color almost entirely obscured by the brown. In those individuals in which the brown coloring is in the form of rows of spots, there are two rows above the lateral line, the one at the base of the dorsal fin the larger, and three more irregular and smaller rows below the lateral line. All the spots tend to become more or less crowded and somewhat fused toward the end of the tail. The dorsal fin is white, with a narrow, submarginal band composed of irregularly defined spots. The dark spotting on the head varies from light to very heavy; correlated with this are narrow black bands on the chin and throat, which vary from two faint to six distinct bands.

Muraenidae

Genus *UROPTERYGIUS* Rüppell

Uropterygius Rüppell, 1835, Neue Wirbelthiere zu der Fauna von Abyssinien gehörig, vol. 1, p. 83 (type *Nebius concolor* Rüppell).

All fins absent or only the rudiments of a dorsal and anal fin present around tip of tail. Anterior nostrils tubular, posterior nostrils developed variously. Cleft of mouth reaching to behind eye, the mouth capable of being closed completely or nearly so. Eye small, covered by skin. Gill openings small, porelike, in the center of body height or somewhat above or below.

KEY TO EASTERN TROPICAL PACIFIC SPECIES

- 1a. Tip of tail with a rudiment of a fin; with at least a few rays present; tip of tail not sharply pointed or hard.
- 2a. Head and trunk longer than tail (Galapagos Islands). *U. polystictus*, new species.
- 2b. Head and trunk shorter than tail (Indo-Pacific, Panama and Colombia). *U. marmoratus* (Lacépède).

- 1b. Tip of tail sharply pointed and hard, with no evidence of fin rays.
- 3a. About fifty narrow, yellow lines over back and down the sides; a yellowish band over mid-part of head (Galapagos, Cocos Island, Panama, Colombia). . . . *U. galapagensis* Seale.
- 3b. Dorsally plain brown; ventrally freckled with brown spots on a lighter background (Gulf of California).
 *U. necturus* (Jordan and Gilbert).

***Uropterygius polystictus*, new species**

Plate 15

Holotype.—AHF no. 16.

Type locality.—Station 793-38, South Seymour Island, Galapagos, collected in tidepool with derris root, January 20, 1938.

Paratype.—One specimen, 185 mm., Station 811-38, Barrington Island, Galapagos, taken from a coral head, January 26, 1938.

Measurements of holotype in mm.—Length 321, head and trunk 165, tail 156, head 36, snout 5.5, eye 3, cleft of mouth 11.5, body depth 23, greatest width of head 18.5, greatest depth of head 21.

Description.—Body rounded anteriorly, the tail becoming compressed posteriorly; skin much wrinkled. Head and trunk longer than tail, which is 1.06 in their length. Depth of body 13.3 in total length; head 9.11 in total length. Eye 12 in head, 1.83 in snout. Snout 6.54 in head. Cleft of mouth 3.05 in head. Width of head 1.94 in its length, 1.16 in depth of head. Head anteriorly broad and heavy, especially in cross section at angle of jaws. Eye nearer tip of snout than angle of jaws, less than two in snout. Anterior and posterior nostrils tubular, tubes of the posterior nostrils equal in length to the tubes of the anterior nostrils, both equal half eye diameter. They are above the eye, but in advance of its center. Gill openings porelike, directed upward and backward, slightly smaller than diameter of eye, inserted at mid-depth of sides.

Maxillary teeth in two series. Outer series of about twenty to twenty-one small, close-set, pointed, slightly recurved teeth on each side. Inner series of large depressible canines, about eight on a side. Both rows continued around the tip of the jaw. Premaxillary teeth arranged in two triangles, the anterior the smaller with its apex toward the symphysis of the jaw, the posterior with apex toward the vomer, and their bases lying almost together. An enlarged tooth at each of the corners of the two triangles. Vomerine teeth about five in number, in a single series, all of

them smaller canines than those of the premaxillaries. Mandibular teeth similar to those of the maxillaries, approximately twenty-five teeth on each side. The inner series comprises about nine teeth on each side, though these are not so large as the teeth of the inner series of the maxillaries. Dorsal and anal fins absent; a slight caudal fringe, with a few rays evident, at tip of tail, almost surrounding it and extending further upward and forward on the dorsal curve than on the ventral. Tip of tail narrower than the remainder of the caudal region, ending in a moderate curve, not sharply pointed.

Body color yellowish, marbled with reddish brown. Over this marbling there are numerous brownish black spots of irregular size and shape. The dark mottling is especially heavy above the midline and on top of the head, almost obscuring the reddish ground color. Ventrally the reddish brown marbling predominates, only a few dark spots being present, mainly around the anal opening and on the tail. Yellowish body color is more strongly evident ventrally, especially on belly and ventral side of head. Anterior and posterior nostrils white. Pores of the upper and lower jaw surrounded by white. Edge of membrane around tip of tail yellowish white.

This species seems to be allied to *U. macrocephalus* of the Indo-Pacific region, with which it agrees in having the trunk and head longer than the tail. It differs from that species in the much shorter head, the greater depth of the body, the much greater development of the posterior nostrils (in specimens of the same size), and the different color pattern.

Genus GYMNOTHORAX Bloch

Gymnothorax Bloch, 1795, Naturgeschichte der ausländischen Fische, part 9, p. 83 (type *G. reticularis* Bloch, under suspension of the Rules by the International Commission on Zoological Nomenclature, Opinion 93, 1926, Smithsonian Misc. Coll., vol. 73, no. 4, p. 5).

Lycodontis M'Clelland, 1844, Calcutta Journ. Nat. Hist., vol. 5, no. 18, pp. 173, 185 (type *L. literata* M'Clelland by subsequent designation of Jordan and Evermann, 1896, Bull. U.S. Nat. Mus., no. 47, p. 392).

Rabula Jordan and Davis, 1892, Report U.S. Fish Comm. for 1888, vol. 16, p. 589 (type by original designation *Muraena aquae-dulcis* Cope).

Fowler (1936, Bull. Amer. Mus. Nat. Hist., vol. 70) has shown very definitely that Bleeker (1863, *Natuurkundige Verhandelingen van de Hollandsche Maatschappij der Wetenschappen te Haarlem*, ser. 2, vol. 18, p. 130) was the first to designate a type species for *Gymnothorax*, and that he designated *G. catenata* Bloch, which is a species of *Echidna* Forster, 1777. The name *Gymnothorax* thus disappears from the system. Fowler also shows good reasons, based on a proper appreciation of "first type designations," for applying the name *Muraena* Linnaeus, 1758, to the genus commonly known as *Anguilla*. Under Fowler's arrangement, *Anguilla* auctorum becomes *Muraena*, *Muraena* auctorum becomes *Muraenopsis*, and *Gymnothorax* auctorum becomes *Lycodontis*.

The utter confusion which these shifts would introduce into the nomenclature of several of the commonest genera and best-known families of eels is patent, and anything that can be done to save the old and universally accepted usage is to be commended. However, no especial action seems needed at the present time, owing to several things entirely overlooked by Mr. Fowler.

The International Commission on Zoological Nomenclature, in Opinion 93 (cited above in synonymy) has shown that *Gymnothorax* was originally merely a substitute name for *Muraena* Linnaeus, 1758, and therefore, under the Rules, automatically takes as type the same type as *Muraena*, namely, *M. helena* Linnaeus, 1758. However, since this would evidently cause confusion in established nomenclature, the Commission has, under suspension of the Rules, placed *Gymnothorax* in the International Official List of Generic Names, with *G. reticularis* Bloch, 1795, as its type.

Moreover, in Opinion 77 (1922, Smithsonian Misc. Coll., vol. 73, no. 1, p. 71), the Commission has placed *Muraena*, type *M. helena*, in the Official List. This timely action saves the well-known genus *Anguilla* in its universally accepted sense, and negates the confusion that Fowler would so rashly introduce into the literature.

KEY TO EASTERN TROPICAL PACIFIC SPECIES

- 1a. Body color brown, either plain or marked with darker, never with yellowish or whitish.
- 2a. Body color uniform brown.
- 3a. Outer series of teeth thickened, bent abruptly backward at tips, the posterior concave margin distinctly serrate; lower jaw bent

- upward; pores in jaws whitish; margin around eye blackish (Panama and Galapagos Islands). *G. panamensis* (Steindachner).
- 3b. Outer series of teeth not abruptly retrorse and not serrate; teeth in jaws very long and fanglike; both jaws bent toward each other at the tips; lips thin, not concealing teeth when gape is closed; no whitish pores, no blackish margin around eye (Colombia and Galapagos Islands). . . *G. octavianus*, new species.
- 2b. Body color brown with darker markings, marblings or reticulations.
- 4a. Tail considerably shorter than head and trunk.
- 5a. Maxillary teeth biserial, rest of teeth uniserial; coffee brown, irregularly marbled with darker (Chile). *G. chilensis* (Günther).
- 5b. All teeth uniserial; brown with irregular darkish venules (Chile). *G. modesta* (Kaup).
- 4b. Tail equal to or longer than head and trunk; eye in center of gape.
- 6a. Head 3.36 to 4.43 in trunk; eye small 15.3 to 15.8 in head; gill opening larger than diameter of eye; irregularly reticulated with dark over body (Peru). *G. wieneri* Sauvage.
- 6b. Head 2 to 2.66 in trunk; eye large, 8.6 to 9.6 in head; gill opening much smaller than eye diameter; dark color in faint, wavy, anastomosing, more or less complete crossbands (Indo-Pacific, Galapagos). *G. chilospilus* Bleeker.
- 1b. Body brownish, reticulated, speckled, or banded with *both* light and dark markings.
- 7a. Body pattern spotted or reticulated, but never banded.
- 8a. Dorsal inserted on head in advance of gill opening.
- 9a. Head 3.3 to 3.6 in trunk; eye 10.2 to 13.6 in head; body brown, spotted with pale yellow spots, which are sometimes reduced to mere specks (Mazatlan, Mexico, to Colombia and Galapagos Islands). . . *G. dovii* (Günther).

- 9b. Head 2 to 2.6 in trunk; eye 8.4 to 8.75 in head; body with yellowish-gray reticulations under brownish spots and markings (Indo-Pacific, Galapagos Islands). *G. undulatus* (Lacépède).
- 8b. Dorsal inserted over gill openings; ground color light brown, with numerous dark brown spots mixed with white (Juan Fernandez Island, Chile). . . . *G. porphyrea* (Guichenot).
- 7b. Body banded with narrow bands of yellowish brown, about 20 in number, each one third width of the blackish interspaces (Galapagos).
. *G. chlevastes* (Jordan and Gilbert).

Gymnothorax octavianus, new species

Plate 16

Holotype.—U.S. National Museum no. 101801.

Type locality.—Station 435-35, Octavia Bay, Colombia, collected from coral head, January 28, 1935.

Paratype.—One specimen, 187 mm., Station 811-38, north of Barrington Island, Galapagos, collected from coral head, January 26, 1938.

Measurement of holotype in mm.—Length 294, head and trunk 133, tail 161, head 39, snout 8, eye 3.5, depth 6, cleft of mouth 17, interorbital 3.75.

Description.—Body elongate, somewhat subcylindrical, becoming slightly compressed posteriorly. Depth 19.5 to 20.8 in total length. Head and trunk shorter than tail by three fourths length of head, 1.21 to 1.25 in tail. Head long and slender, not greatly expanded at occiput, 7.5 to 8.5 in total length. Eye 8.8 to 11.4 in head, 1.8 in snout. Snout 4.8 to 4.86 in head. Cleft of mouth 2.3 in head. Interorbital 10.4 in head. Dorsal fin inserted over gill openings, high and well developed, especially posteriorly, confluent with anal around tip of tail. Anal fin well developed but not as high as dorsal. No paired fins present. Several longitudinal folds in membrane covering dorsal fin.

Dorsal outline of head only moderately swollen at occiput and slightly concave over eye. Upper and lower jaws curved toward each other at the tips; the mouth cannot be completely shut. Lips thin and not concealing teeth on upper and lower jaws when mouth is closed. Cleft of mouth wide; eye at mid-point between symphysis and angle of jaws. Anterior

nostril tubular, near tip of snout. Posterior nostrils above and in front of eye, with a slightly raised rim, but not tubular. Gill openings small, length equals diameter of eye; opening almost horizontal, below the mid-line of sides. Gular region with heavy longitudinal folds ventrally and laterally.

Maxillary teeth biserial with the exception of about three teeth lying between the two rows at the mid-point of the gape. Outer series of teeth small, compressed, sharp, close set, and irregular in size. Every fourth tooth is two or more times as long as the three intervening teeth. Inner series of large, widely spaced, fanglike, depressible canines, nine on a side. Three large, depressible canines on the median line of the premaxillary plate. Fourteen small, conical, uniserial teeth on the shaft of vomer. Mandibular teeth biserial. Outer series small, compressed, sharply pointed, and close-set teeth of irregular size. Inner series of 11 widely spaced, large, sharp, fanglike canines.

Color a uniform brown, except for the lower jaw, the chin, and the gular region, which are light tan faintly mottled with darker. Skin in the longitudinal folds of the gular region darker than the surface.

G. octavianus is distinguished from other species of this genus found in this area by its long and slender head, the presence of extremely long, fanglike teeth, the wide cleft of the mouth, which does not completely close, the thin lips, which do not entirely cover the teeth when the gape is closed, the uniform brown color, and the insertion of the dorsal fin.

All specimens illustrated are holotypes unless noted to the contrary.

All illustrations were drawn by Pascual Ortiz.

PLATE 7

Chiloconger labiatus, n. gen., n. sp.

1. Side view of holotype.
2. Enlarged side view of head.
3. Dentition.

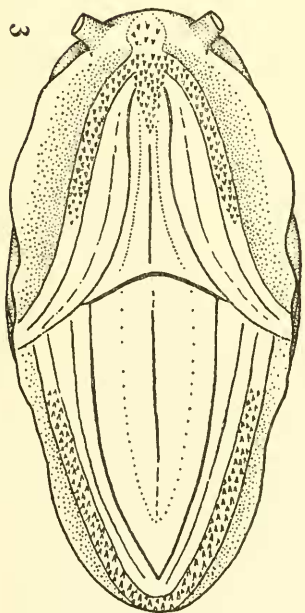
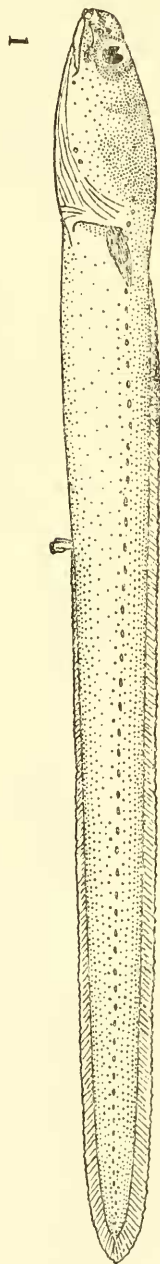
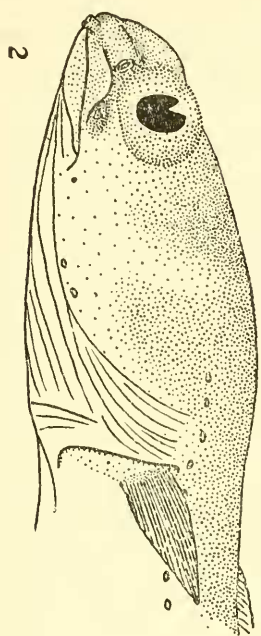


PLATE 8

Ariosoma vomerina, n. sp.

1. Enlarged side view of head of holotype.
2. Under view of head.
3. Side view of entire fish.
(Owing to the difficulty of examining the teeth of the unique specimen, no illustration of the dentition could be prepared.)

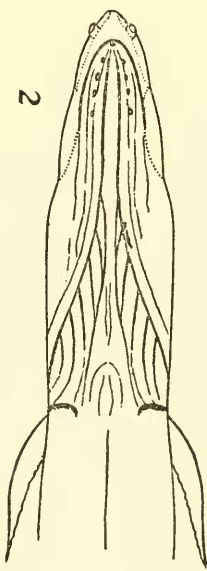
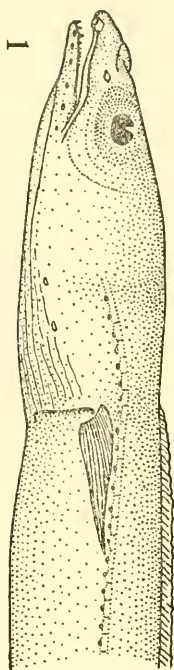
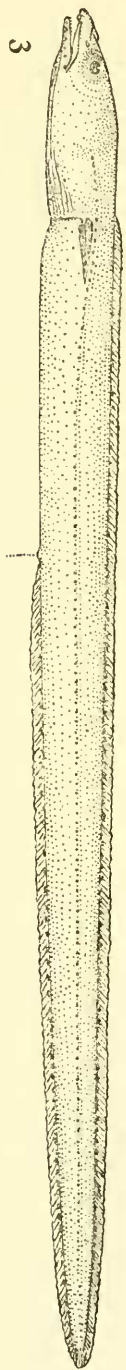


PLATE 9

Garmanichthys bicollaris, n. sp.

1. Side view of head of holotype.
2. Anal region of body.
3. Dentition.
4. End of tail.

(What appear to be the teeth in the upper jaw in fig. 1 are the villi along the edge of the upper lip.)

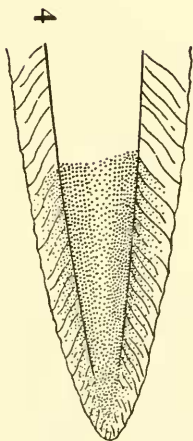
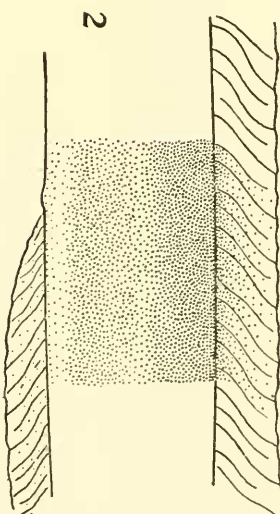
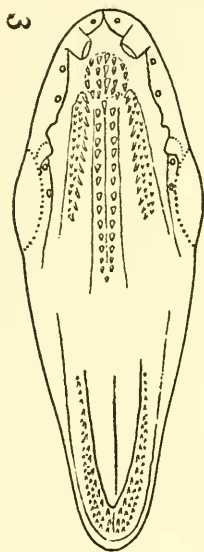
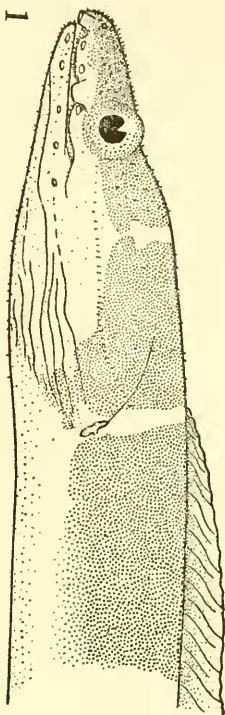


PLATE 10

Leptenchelys vermiformis, n. gen., n. sp.

1. Side view of holotype.
2. Enlarged side view of head.
3. Dentition.

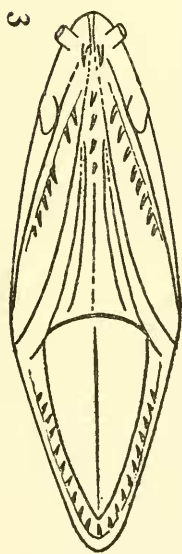
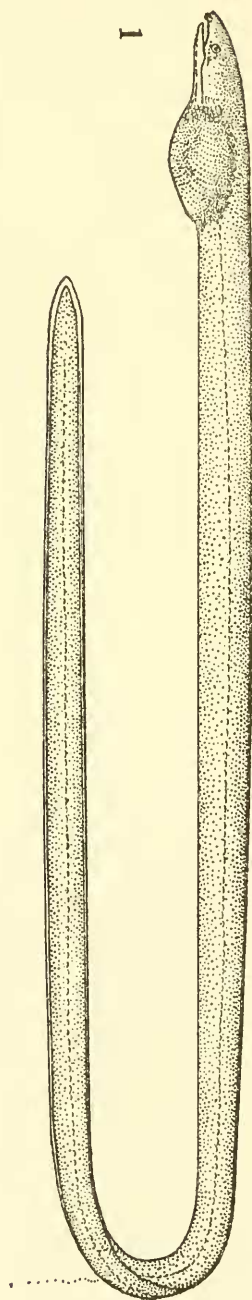
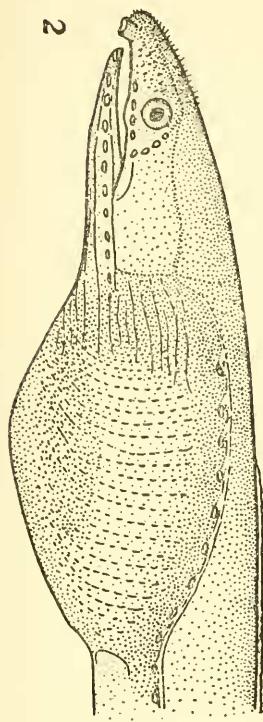
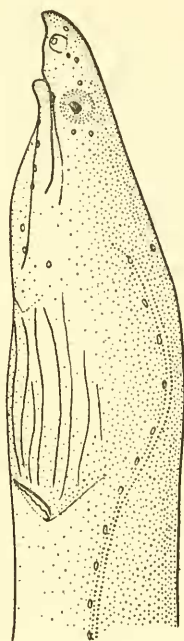


PLATE 11

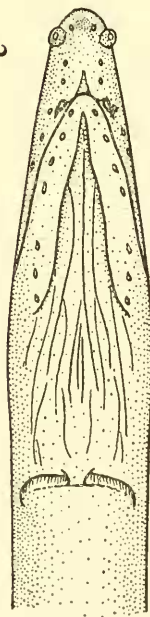
Caecula equatorialis, n. sp.

1. Side view of the holotype.
2. Under view of head.
3. Dentition.

1



2



3

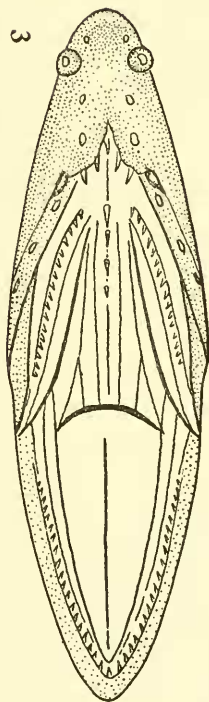


PLATE 12

Phaenomonas pinnata, n. gen., n. sp.

1. Holotype, entire specimen.
2. Enlarged side view of head.
3. Dentition.

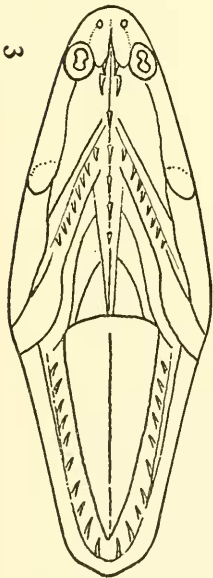
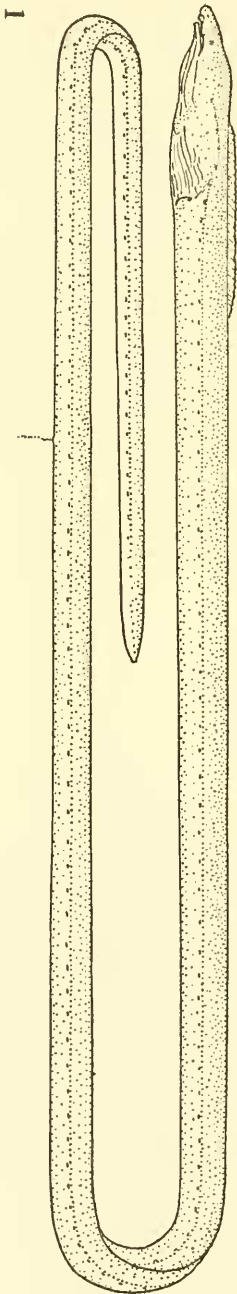
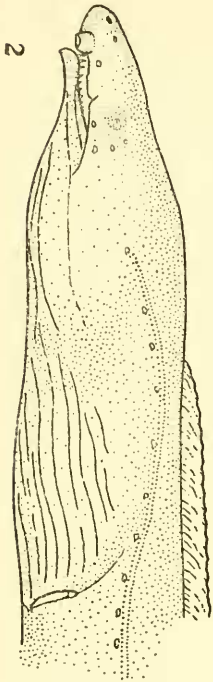


PLATE 13

Pognophis fossatus, n. gen., n. sp.

1. Side view of head of large paratype.
2. Dentition of large paratype.
3. Side view of holotype.

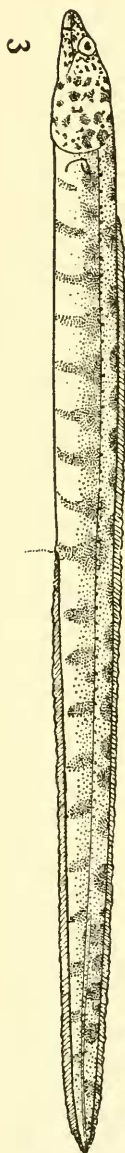
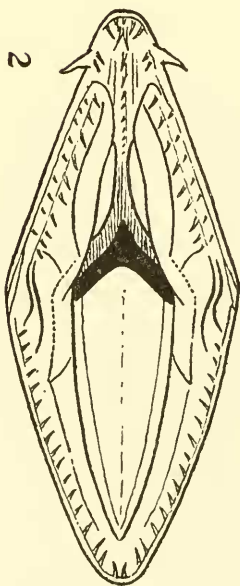
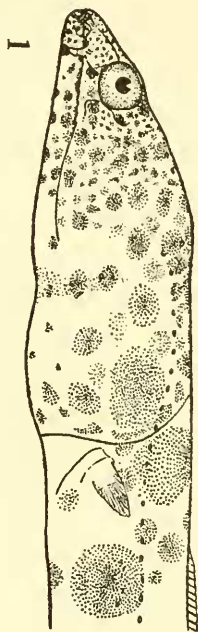


PLATE 14

Letharchus opercularis, n. sp.

1. Side view of head of holotype.
2. Color pattern in anal region.
3. Dentition.
4. Under side of head showing pseudo-opercula.

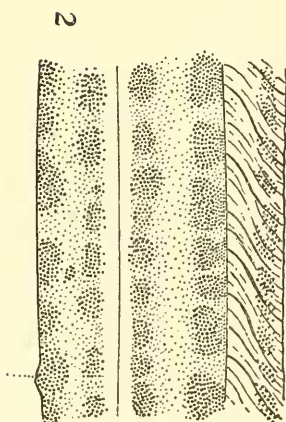
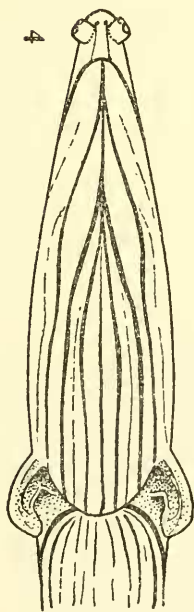
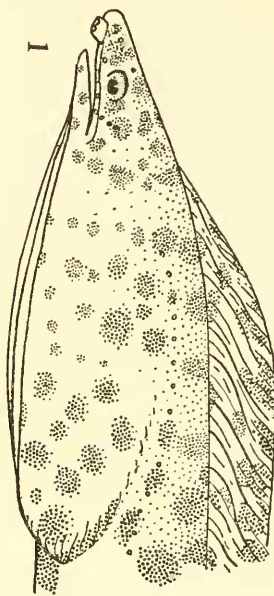
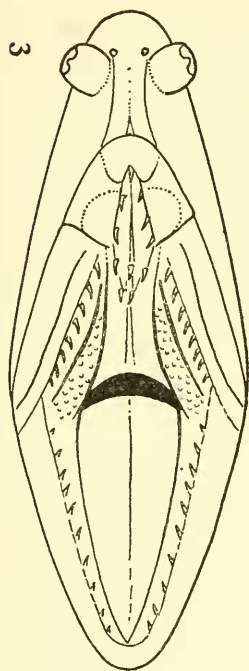


PLATE 15

Uropterygius polystictus, n. sp.

1. Side view of head of holotype.
2. Color pattern in preanal region.
3. Dentition.
4. Tip of tail.

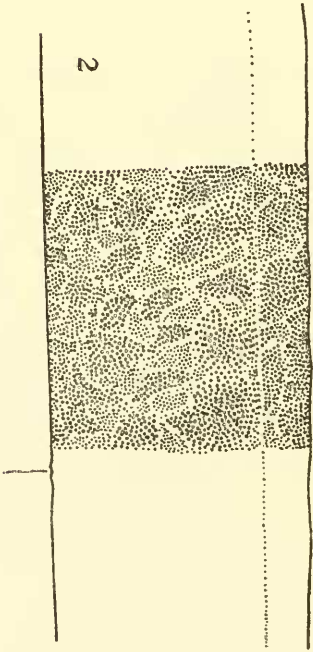
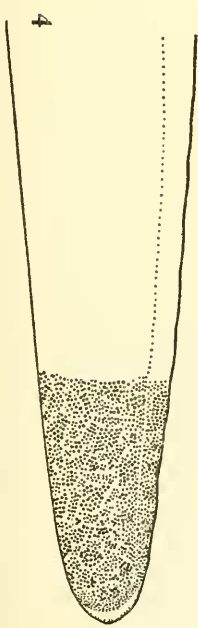
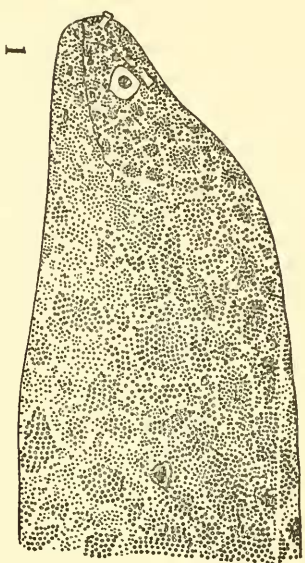
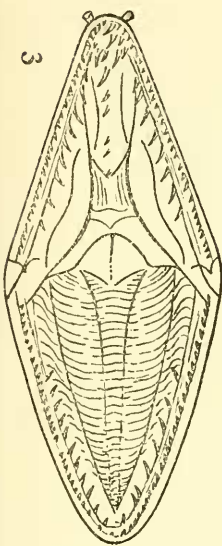


PLATE 16

Gymnothorax octavianus, n. sp.

1. Side view of head of holotype.
2. Anal region.
3. Dentition.
4. Tip of tail.

